



May 2009

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

for the technical and logistical supervision of the project as well as other technical and administrative services related to the works to be done locally including safety certification and local purchase of equipment tools and instrumentation required for the conversion of extruded polystyrene foam blowing from CFCs to n-butane at Laminat DOO.

**Project MP/YUG/06/005
National CFC phase-out plan
(third tranche)**

Foam sector implementation program of NCPP
The phase-out of CFC-11 in the manufacture of extruded polystyrene foam through the use of n-butane as a blowing agent at Laminat DOO

These **Terms of reference** shall be used for the preparation of bids for the supply of technical services, consultancy and equipment required for the conversion of the production process in order to phase out the use of CFC-11 in the production of **extruded polystyrene foam** at the above named factory. This document specifies the scope of supply of goods and services as well as the obligations and responsibilities of the supplier.

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I. GENERAL BACKGROUND INFORMATION

Based on the request of the Government of Serbia and Montenegro, the National CFC phase-out plan (NCPP) was prepared by Ministry of Protection of Natural Resources and Environment Protection, Republic of Serbia – the Ministry in charge of ozone issues in the Republic of Serbia and Montenegro with the assistance from UNIDO and Sweden. The proposal aims at reduction of the consumption of Annex A, Group I substances, CFCs in Serbia and Montenegro in compliance with the Montreal Protocol obligation.

This project represents foam sector sub-component of the NCPP to be funded by the Multilateral Fund for the implementation of the Montreal Protocol.

1. COMPANY BASELINE DATA

1.1 General information

Laminat A.D. is a 100% indigenously owned private company established in 1980 and employs 72 people (9 administrative, 4 technical and 59 operators). The company is producing thermoformed packing products and also laminate cardboard packaging products. The factory is situated in Bajina Bašta 300 km far from Belgrade. 3-5% of its production is exported to Bosnia & Herzegovina.

The average consumption of the company during the years 2000 to 2002 was 36 tonnes of CFC-11 and 36 tonnes of CFC-12.

In 2002, the company produced 404 tonnes of extruded foamed polystyrene split as follows:

- 15% EPS folia. ("Laminat" boards covered with paper)
- 50% trays for food packing (54 different type of trays)
- 35% EPS sheets for insulation purposes. (3 different dimensions)

Address of the company:

Laminat DOO
Bajina Basta
Serbia

Owner: Mr. Milenko Kovacevic,

Tel: ++381 65 550 6924

Director: Ms. Miljana Delic,

Tel: ++381 65 550 6925

E-mail: contprom@eunet.yu

1.2 Present technology and production equipment

Storage facilities:

All chemicals are imported from variety of suppliers including Bayer, Arco Chemicals and ICI.

Extrusion line:

Production of the company is based on an extrusion line, made by LMP, Italy, Torino:

RC 41/E - extruder for production of foamed polystyrene, with installed capacity of 700 MT/year. Manufactured in 1982. Installed in 1982.

- type	twin-screw, co-rotating
- screw diameter	102 mm
- screw length	21 D
- drive	35 HP, DC electric motor
- cylinder heating	electric resistances wires
- die head	with oil conditioning unit complete with air cooling ring
- dosing of polymer through	Engelhardt (mechanical balance loaded vibrating trough)
- dosing of solid additives through	Engelhardt (mechanical balance loaded vibrating trough)
- low and high pressure pump for CFCs	
- control board for temperature, torque and screw speed control	
- take-of with two rubber coated cylinders	
- winding unit	

The extruded polystyrene sheets are processed in the company, producing various plates and trays for food packaging. Extruders operate in three 8 hour shifts a day working cycle, and thermoforming machines in one 10 hour shift/day.

Finishing production equipment:

Thermo-forming machines, tray production and laminator (paper wrapping)

II. AIM OF THE PROJECT

The objective of this project is the phasing out of CFCs in the production of extruded foamed polystyrene sheets used for food packaging, technical packaging and insulation purposes in Laminat. The existing technology will be converted to non-ODS one and CFC- 11 will be substituted by butane as an alternative-blowing agent.

1. PROJECT DESCRIPTION

Under this project, Laminat will phase out the use of CFC-11 in its manufacturing operations. The technology chosen is the use of butane as a blowing agent in the production of extruded PS foam.

The project includes:

- replacement of existing extruder for the new foaming unit designed especially for the use of butane as non ODS and eco efficient blowing agent;
- storage tank for the bulk reception of butane, piping and pumps that comply with the safety requirements corresponding to combustible liquids;
- installations for detection of butane with sufficient number of sensors located in production plant and storage area
- improvement of the fire extinguishing installation with sufficient sensors located in the production and storage areas;
- proper installation of all machinery in Explosion Zones to be sufficiently ventilated, ex-proof and grounded;
- Safety certification

III. THE SCOPE OF CONTRACTING TECHNICAL SERVICES CONSULTANCY AND SUPPLY OF EQUIPMENT

a) General terms

Note

It is recommended to pay a visit to Laminat DOO prior to the submission of the offer to UNIDO so as to be acquainted with the actual situation at the company and to discuss the details concerning scope of supply of equipment (foaming line and thermoforming follow up) and related liaison with the suppliers of main equipment, civil engineering works, location of main equipment and sub-assemblies, blowing agent storage tank, distribution of blowing agent, mechanical and electrical engineering details, additional details on the technical specifications of safety equipment and instrumentation to be procured locally as well as the details of local safety approvals and administrative process of safety certification.

- It is requested that the contractor will provide consultancy, technical and logistical supervision of the project as well as other technical and administrative services related to the works to be done locally including safety certification and local purchase of equipment tools and instrumentation according to the Project Document, Technical Characteristics, Scope and Terms of Supply of main equipment and in close collaboration with suppliers of main equipment (extrusion and thermoforming) for all segments of the project.

- Client oriented expertise should be provided.

- Properly diversified workforce comprising of task oriented specialists with required expertise in all segments of this project has been provided.

- Since collaborating with the suppliers of imported equipment is inevitable for this project ,
 - therefore it is crucial that innovative, cooperative and flexible management for execution of this contract is strictly applied.

b) Detailed scope of work

#	Activities	Responsibility
1	Technical concept documentation, design and drawings to be prepared in compliance with technical concept of main equipment suppliers. The documentation should consist of the following components:	Sole responsibility of contractor
	<ul style="list-style-type: none"> - Mechanical and electrical project for safety measures, location of butane leakage and fire detectors, sound and visual alarm system - Detailed mechanical drawings (project) for entire plant ventilation system and duct works - Mechanical design (project) for butane storage including detailed design of butane tank and accessories (fittings, level detection, N₂ blanketing, double wall and leakage detection for under ground storage.) - Mechanical design (pipe work) for butane supply including low pressure pump valves, fittings, manifolds - Electrical design (project) for installations at butane storage area - Civil construction design (project) for butane storage and supply - Detailed technical and technological drawings (project) for installations at the production area including extrusion & foaming and thermoforming 	Contractor. Liaison with supplier of main equipment is mandatory
	<ul style="list-style-type: none"> - Technical supervision of preparatory pre-installation and installation works at the project site. - On site technical supervision and management of installation and construction works. Coordination of each activity with beneficiary and liaison with main equipment suppliers in technical and technological issues. 	Contractor. Collaboration with supplier of main equipment

		and end user is mandatory
	Technical and techno economical evaluation of local offers for individual equipment (e.g. ventilators, el. servo-motors, tools and other instrumentation), analysis, reporting and liaison with end-user and main equipment suppliers where necessary. Consultancy and technical advise to end-user on different modalities and techno-economical solutions.	Contractor. Liaison with end user is vital.
2	Safety related consultancy and administration works	Sole responsibility of contractor
	Supervision of works according to the law and necessary safety measures (explosion and firefighting), including also arrangement for final safety certification. This assumes all the stages to the final commissioning and start-up of the machines and whole plant with all the installations.	
	Provision of safety certificate for entire plant	Sole responsibility of contractor
3	Mechanical works - Butane storage tank and accessories Chief technical characteristics of butane tank: 1. Volume 4 and 5m3 Two tanks to be fabricated to meet counterpart's requirement to have variability in terms of purchase- production -demand. 2. thickness of the wall min. 6mm 3. quality of material S 355J2G3 4. working pressure 15-20 kp/cm2	Contractor. Liaison with local environmental and fire fighting authority is inevitable!
	Supply butane storage tank, including accessories and fittings. To be designed in collaborating with the supplier of foaming extruder and fabricated and installed in accordance to the supplier's technical and safety concept and in line with local environmental and safety requirements.	
	Supply and fit the blowing agent pipe work from bulk storage tank to the metering and dosing unit	
	Supply and fit the pipe work for the fire fighting sprinkler system the butane storage area.	
	Supply and fit butane gas sensor brackets in the butane storage area the production area as well as in end product storage area according to the safety design of the supplier of main equipment and in line with local safety rules.	
4	Mechanical works - Ventilation and gas detection	Contractor. Liaison with end user is vital.
	Supply and fit the ventilation ducting and fix the fan assemblies where designed	
	Supply and fit the enclosure (housing) and ventilation for high pressure metering and dosing pump.	
5	Electrical works	Contractor. Liaison with end user is vital.
	Supply and fit power cables to the main equipment control panels (for extrusion and thermoforming)	
	Supply and fit necessary cabling to interconnect safety control panels, gas sensors and control panels of main equipment (extrusion and thermoforming).	
	Provide installation assistance to the technicians of main equipment supplier(s) for local safety requirements.	
	Supply and fit earthing components (rope wire, clamps, brackets etc.)	
6	Civil works	Contractor. Liaison with end user and local authorities is vital.

	Supply and supervise works for the foundation of the butane bulk storage tank and truck tanks	
	Civil works for earthing	
	Supply and fit support frameworks/foundations for ventilation and ductwork assemblies	
7	General site works To be provided as a minimum as mentioned below	Contractor. Collaboration with supplier of main equipment and end user is mandatory
	Supervise clearing the sites and pre-installation works for blowing agent bulk tank, extrusion foaming line and thermoforming unit.	
	Ensure a licensed welder for the butane pipe work	
	Ensure licensed and responsible electricians with authority to operate in the factory according to local rules and regulations.	
	Ensure skilled plumbers to fit high pressure pipe works as well as water pipeworks including sprinklers and other fire fighting facilities	
	Ensure work force and supervise help to unpack, position, erect and install the equipment for extrusion/foaming and thermoforming	

Note: Expedient preparation of the site prior to installation of equipment is important, therefore potential contractor has to declare his full awareness about the project including written evidence that the visit to Laminat Doo has been paid and discussions with the management had been held as mentioned above.

c) Safety related responsibilities of the Contractor

It is requested that the bidder submits the following as an organic part of the technical proposal:

1. List of technical documentation to be provided and concept of technical supervision of works as in accordance with activity No.1.
2. Draft concept how local safety permissions will be ensured according to local legislation (low) regarding explosion, fire fighting, environment and occupational safety of workers and operators. Refer to activity No. 2

d) TERMS OF GUARANTEE

- The Contractor should guarantee the quality and completeness of equipment and services, as specified under above mentioned Scope of Supply.

- Mechanical, electrical, performance and safety guarantee for supplied should be quoted for at least 12 months after obtaining the acceptance certificate for installed and commissioned equipment.

e) SPARE PARTS

The list for standard set of spare parts for supplied equipment must be organic part of the offer.

IV. GENERAL TIME SCHEDULE

The proposal of the detailed time schedule for the execution of the project has to be an organic part of the offer. The schedule must indicate relevant activities and milestones for their accomplishment in a tabulated form.

The work programme must contain, but is not limited with the following relevant activities, in order to ensure a harmonious implementation of the contract in

Step	Completion time [week]	Activities	Responsibility
1	2	Technical concept documentation, design and drawings	Contractor
		Detailed general concept and scope of supply has to be provided as an organic part of the offer	
2	4	Civil works	Contractor
		(please itemize in details)	
3	5	First Progress report is due - to report on the readiness of the project site for installations of main equipment and related safety components, so that the invitation of supplier's technicians for final installation of equipment could be validated..	Contractor
4	5	General site works Project site preparation for conversion before installation of main equipment to be finalized	Contractor and Counterpart
		(please itemize in details)	
5	3 - 12	Delivery of equipment specified in the contract	Contractor
		(please itemize and specify in details) Inspection of the site together with the UNIDO project manager is obligatory at the end of this stage. This will include the check on the readiness of the project site for the final installations as well as the check on the completeness of the deliveries.	
6	3 - 13	Mechanical and Electrical works to be completed	
	13	Draft final report is due	Contractor
7	14	Safety related consultancy and administration works to be completed	Contractor
8	14	Final report accompanied with: - Safety certificate for entire plant - Letter of acceptance countersigned by the end user to be submitted to UNIDO	Contractor

V. PERSONNEL IN THE FIELD

N/A

VI. LANGUAGE REQUIREMENTS

N/A

VII. DELIVERABLES

Following deliverables are required:

- **Technical specifications** of equipment to be delivered

- **Reports** are requested as following:

- a) First Progress report; after accomplishment of pre-installations works as in accordance to General Time Schedule
- b) Draft Final report; after accomplishment of installation and safety related works as in accordance with General Time Schedule
- c) Final Report; after accomplishment of all installation works including safety systems, commissioning and handing over technology to beneficiary.

VIII. RECOMMENDED TABLE OF SCOPE OF SUPPLY (CONTROL TABLE – EVALUATION CRITERIA)

UNIDO RFP reference No.

Scope of supply: Technical and logistical supervision of the project as well as other technical and administrative services related to the works to be done locally including safety certification and local purchase of equipment tools and instrumentation required for the conversion of extruded polystyrene foam blowing from CFCs to n-butane at Laminat DOOs detailed above

UNIDO REQUIREMENTS			TO BE COMPLETED BY THE INVITEE			
Item	Name and required parameters	Quantity	unit price	total item price	Compliance*)	Remarks**)
			currency: US Dollar\$	currency: US Dollar\$	yes/no	
1	I. Technical Services					
	Complete package of documentation, engineering design and technical drawings.	1 set				
1.2	Safety certificate					
	Technical design for butane storage and piping/alimentation (detailed drawings), including detailed drawings of explosion and firefighting safety design.	1 set				
2	II. Equipment,					
2.1	Butane tank and accessories	1				
2.2	Safety related components and instrumentation	1 set				
3	III. Installation, commissioning					
	Assistance to the suppliers of main equipment	Min. 0.8 w/m				
	Sub-total:					
4	IV. Cost of transportation					
	V. Cost of Insurance (if applicable)					
	Total price:					
	DDU: N/A					

*) compliance must be confirmed in detail in the by the contractor's offer and technical documentation and will be verified by UNIDO during technical evaluation;

**)if not compliant with UNIDO's required parameters, the invitee must indicate his parameters in this column